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VOL. 14 No. 12 March 20, 1964

Cooperative ECONOMIC INSECT REPORT

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PLANT PEST CONTROL DIVISION

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 14 March 20, 1964 Number 12

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

PEA APHID building up on alfalfa in areas of California, Arizona and New Mexico (p. 209). Larvae of a WEEVIL (Hypera brunneipennis) present in many fields of alfalfa in Imperial Valley of California and continue damaging on Yuma Mesa of Arizona. (p. 210).

GLOVER SCALE, CHAFF SCALE and YELLOW SCALE populations at record high levels for February on Florida citrus. (p. 211). CITRUS RED MITE populations sufficient to require treatment on citrus in Coachella Valley, Riverside County, California. (p. 212). BEET ARMYWORM, BLACK CUTWORM and DARKLING BEETLES medium to heavy on young sugar beets in Hungtinton Beach, Orange County, California. (p. 212). POPLAR PETIOLE GALL APHID light to heavy on cabbage and unspecified aphids moderate to heavy and requiring controls on tomatoes in Hidalgo County, Texas. (p. 213).

Two cases of myiasis caused by SCREW-WORM recently disclosed in Texas. (p. 215). BOXELDER BUG a nuisance in homes in Delaware, Maryland, Virginia, North Carolina, Michigan and Utah. (p. 216).

Two KHAPRA BEETLE infestations found in Yuma County, Arizona. (p. 217).

SOME FIRST RECORDS OF THE SEASON

CEREAL LEAF BEETLE adults in Berrien County, Michigan; PEA APHID in Washington County, Arkansas; ALFALFA WEEVIL larvae in Georgia; ALFALFA CATERPILLAR in south central Oklahoma; COMMON CATTLE GRUB adults in Payne County, Oklahoma; HORN FLY adults in Payne County, Oklahoma; and first instars of a MOSQUITO (Aedes canadensis) in Prince Georges County, Maryland.

FORECASTS

Light population of GREEN PEACH APHID possible in Palisade and Vineland area of Mesa County, Colorado. (p. 211). BEET LEAFHOPPER movement to cultivated districts of central Arizona, southeastern California, southern Nevada, southern and eastern Utah and western Colorado expected to be heavy, and movement into northern Utah and western Nevada expected to be moderate to heavy. (p. 212). Light infestation of POTATO PSYLLID indicated this season in spring breeding areas of Arizona and California. (p. 212). TENT CATERPILLAR populations in Travis County, Texas, may be as high as 1963's severe outbreak. (p. 213).

DETECTION

HUMAN FLEA (Pulex irritans) found in Churchill County, Nevada; first ARS record for State. (p. 216). New county records of significance were CHAFF SCALE (Parlatoria pergandii) in Sutter County, California (p. 211), and a PSYCHID MOTH (Apterona crenulella) in Ormsby County, Nevada (p. 214).

SPECIAL REPORTS

Potato Psyllid Survey, Spring Breeding Areas of Arizona and California - 1964. (p. 212).

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Second Beet Leafhopper Survey in Desert Areas of Central Arizona, Southeastern California and Southern Nevada and Utah. (p. 212).

Status of the Screw-worm in the Southwest. (p. 215).

Summary of Insect Conditions in Hawaii - 1963. (p. 220).

Summary of Insect Conditions in the United States - 1963
Tobacco Insects. (p. 224).
Cotton Insects. (p. 226).

Reports in this issue are for week ending March 13 unless otherwise indicated.

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WEATHER BUREAU'S 30-DAY OUTLOOK

MID-FEBRUARY TO MID-MARCH 1964

The Weather Bureau's 30-day outlook for mid-March to mid-April calls for temperatures to average below seasonal normals in a large area extending from the lower Mississippi Valley through the Southern Plains into the Great Basin. Above normal averages are in prospect for the Northeast, Great Lakes and Northern Plains, and also in southern portions of Florida and California. In regions not specified, near normal temperatures are indicated.

Precipitation is expected to exceed normal between the Mississippi Valley and Appalachian Mountains and also in the central Rocky Mountain States. Subnormal amounts are predicted for the Carolina coast, Northern Plains, and Far Southwest. In the remainder of the Nation precipitation should be about normal.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D. C. 20250. Price $4.80 a year, $2.40 a half year.

WEATHER OF THE WEEK ENDING MARCH 16

A frontal system extending from Texas to New England at the beginning of the period continued across the eastern United States on the 9th and 10th, and was responsible for widespread precipitation, heavy snowfall, and high winds in the Northeast, flood producing rains in the Ohio Valley, and tornadoes in Mississippi, Tennessee, and Alabama.

Heavy rainfall totaling up to 7 inches or more over the Ohio Valley resulted in near record flooding and extensive damage in the Ohio River Basin. Louisville, Kentucky, on the 9th and 10th measured its heaviest 24-hour rainfall in its history, 6.97 inches. Owing to this heavy rainfall, total precipitation for March 1964 already exceeds previous records for March at numerous stations. To date, Cincinnati, Ohio, has recorded 11 inches and Columbus, Ohio, nearly 9 inches.

(Continued on page 234).

CEREAL AND FORAGE INSECTS

GREENBUG (Schizaphis graminum) - NEW MEXICO - Light in small grain in northern Eddy County; ranged 2-10 per linear foot. (N.M. Coop. Rpt.). OKLAHOMA - Reports statewide indicate populations continue at noneconomic level; counts well below 10 per linear foot, except in 1 location in Mayes County where 20 per linear foot on oats noted. Many checks made in south central, southwest and west central areas negative; averages fewer than 5 per linear foot. (Okla. Coop. Sur.).

APPLE GRAIN APHID (Rhopalosiphum fitchii) - TEXAS - Heavy, localized populations reported on wheat and oats in Brazos County. (Randolph). OKLAHOMA - Populations continue at very low levels statewide; fewer than 5 per linear foot. (Okla. Coop. Sur.).

ENGLISH GRAIN APHID (Macrosiphum avenae) - OKLAHOMA - Continues at very low levels; fewer than 5 per linear foot in all areas. (Okla. Coop. Sur.).

GREEN PEACH APHID (Myzus persicae) - FLORIDA - Light to moderate on leaves of corn at Plantation, Broward County (McLean, Clinton); light on corn ears at Goulds, Dade County (Knowles, Brown, Mar. 4).

SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) - FLORIDA - Common rye, with seed heads well formed, yieled 13 adults per 100 sweeps at Gainesville, Alachua County. (Mead).

CEREAL LEAF BEETLE (Oulema melanopa) - MICHIGAN - First adult activity noted March 4 when very few beetles swept from quackgrass as temperatures rose into 50's and above. Collection made in heavy infestation area near Galien, Berrien County. (Ruppel, Remington).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - ALABAMA - Of 28 girdled stalks examined in Fayette County, 7 larvae survived in one field where land is low and waterlogged through most of winter months. Other larvae dead but cause unknown. No pupation of borers occurred. Four stalks recently girdled, with larvae not present; apparently taken by birds. (Eden et al.).

EUROPEAN CORN BORER (Ostrinia nubilalis) - ALABAMA - Only small percent of live larvae noted in cornfield in Fayette County; numerous old infested stalks examined. No pupation noted. (Eden et al.).

WINTER GRAIN MITE (Penthaleus major) - OKLAHOMA - Only light, scattered infestations noted in localized south central, southwest and west central areas. (Okla. Coop. Sur.).

BROWN WHEAT MITE (Petrobia latens) - OKLAHOMA - None reported to date, but March 14 is average first occurrence based on records of past 4 years. (Okla. Coop. Sur.).

GRANULATE CUTWORM (Feltia subterranea) - TEXAS - Heavy in St. Augustine grass lawns in localized areas of Brazos County. (Randolph).

SOD WEBWORMS (Crambus spp.) - COLORADO - Collected at Greeley, Weld County; caused noticeable damage. (Simpson).

PEA APHID (Acyrthosiphon pisum) - CALIFORNIA - Building up rapidly in alfalfa 4-8 inches high following pasturing or cutting in Imperial County. (C. A. Downing). ARIZONA - Some increase noted in alfalfa in Yuma, Pinal and Maricopa Counties; ranged 40-50 per 100 sweeps. (Ariz. Coop. Sur.). NEW MEXICO - Apparently building up in alfalfa in Eddy County; no noticeable damage. (N.M. Coop. Rpt.). OKLAHOMA - Occasional specimen noted in vetch in Garvin County; negative in other south central locations on alfalfa. (Okla. Coop. Sur.). ARKANSAS - First of season found on vetch in Washington County, northwest. (Ark. Ins. Sur.). FLORIDA Ranged 1,100-1,300 nymphs and adults in 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

LEAFHOPPERS - ALABAMA - Several species active in any and all grass stubble along roads, drives and fence lines throughout State. (McQueen). FLORIDA - Seven adult Agallia constricta collected on 200 sweeps of unsprayed Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

SPOTTED ALFALFA APHID (Therioaphis maculata) - CALIFORNIA - Numerous in some non-resistant alfalfa in Imperial County. (C. A. Downing). ARIZONA - Populations not increased to any degree in alfalfa in Yuma, Maricopa and Pinal Counties. (Ariz. Coop. Sur.). OKLAHOMA - Checks in south central alfalfa negative. (Okla. Coop. Sur.).

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) - ARIZONA - Counts on alfalfa ranged 17-20 per 100 sweeps in Maricopa and Pinal Counties. (Ariz. Coop. Sur.). FLORIDA - Nine adults collected from 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

ALFALFA WEEVIL (Hypera postica) - GEORGIA - First instars found in 3 fields in northeast; several fields examined not infested. (Johnson). Larvae taken from alfalfa at Tifton, Tift County, since January 7. (Byers).

A WEEVIL (Hypera brunneipennis) - ARIZONA - Larvae averaged 1 per sweep in much of Yuma County, but infestations much heavier on Yuma Mesa with counts of 2-3 per terminal. Larvae ranged 20-25 per 100 sweeps in infested fields in Maricopa County. Many parasitized larvae found in both counties. (Ariz. Coop. Sur.). CALIFORNIA - Populations in Imperial Valley, Imperial County, generally light on alfalfa; larvae present in many fields. (C. A. Downing). Larvae heavy on alfalfa leaves in Escondido, San Diego County. (Cal. Coop. Rpt.).

SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata howardi) - OKLAHOMA - Adults becoming active in alfalfa and small grains in south central and southwest areas. (Okla. Coop. Sur.).

GREEN CLOVERWORM (Plathypena scabra) - FLORIDA - Unsprayed Hairy Peruvian alfalfa yielded 58 larvae in 200 sweeps at Gainesville, Alachua County. (Mead).

ALFALFA CATERPILLAR (Colias eurytheme) - OKLAHOMA - Single specimen collected on alfalfa in Bryan County (south central). This is first record of season and well ahead of average first occurrence date of April 19 of past 6 years. (Okla. Coop. Sur.).

CLOVER MITE (Bryobia praetiosa) - ARIZONA - Heavy on lower leaves of alfalfa in Yuma and Maricopa Counties. (Ariz. Coop. Sur.).

AMERICAN GRASSHOPPER (Schistocerca americana) - ALABAMA - Numerous adults observed in broomsedge grass and scattered upland forest in Henry and Lee Counties. (McQueen).

FRUIT INSECTS

CODLING MOTH (Carpocapsa pomonella) - CALIFORNIA - Larvae medium in bark of apple trees in San Jose, Santa Clara County. (Cal. Coop. Rpt).

GRAPE ROOT BORER (Vitacea polistiformis) - ARKANSAS - Continues a problem in northwest; control measure research underway. (Ark. Ins. Sur.).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - TEXAS - Larvae appearing on peach trees in Travis County. (Cook, Newton, Meisch).

PACIFIC FLATHEADED BORER (Chrysobothris mali) - CALIFORNIA - Damaging young fruit trees in Willow Creek, Humboldt County. (Cal. Coop. Rpt.).

A FALSE POWDER-POST BEETLE - TEXAS - Undetermined species damaged fruit and pecan trees in Midland County. (Green).

GREEN PEACH APHID (Myzus persicae) - COLORADO - Overwintering egg counts indicate decrease over 1963; preliminary counts show 21.2 percent of the number compared with 1963. Possibly a light population in Palisade and Vineland, Mesa County. Counts parallel 1960 counts, which were light. (Bulla). FLORIDA - Light on mango at Goulds (Mar. 3) and Homestead (Mar. 5), Dade County (Knowles); this is new host record for Florida Division of Plant Industry. (Fla. Coop. Sur.).

Citrus Insect Situation in Florida - End of February - CITRUS RUST MITE (Phyllocoptruta oleivora) on leaves infested 59 percent of groves (norm 61 percent); 38 percent economic (norm 37 percent). Citrus rust mite on fruit infested 39 percent of groves (norm 49 percent); 20 percent economic (norm 30 percent). Population near normal, moderate level on leaves and below normal on fruit. Little change expected. Highest districts west, north, and south. TEXAS CITRUS MITE (Eutetranychus banksi) infested 35 percent of groves (norm 19 percent); 13 percent economic (norm 6 percent). Population at low level but higher than in prior years; decrease expected. Highest districts west and east; lowest district north. CITRUS RED MITE (Panonychus citri) infested 43 percent of groves (norm 60 percent); 18 percent economic (norm 32 percent). Abnormally low population level prevails and only a few scattered groves will have important infestations. Highest districts west and north. PURPLE SCALE (Lepidosaphes beckii) infested 76 percent of groves (norm 80 percent); 6 percent economic (norm 15 percent). Population below average; no heavy infestations expected. GLOVER SCALE (L. gloverii) infested 75 percent of groves (norm 23 percent); 11 percent economic (norm 1 percent). Population at record high for February; a few heavy infestations expected. Highest districts east, south and central. CHAFF SCALE (Parlatoria pergandii) infested 75 percent of groves (norm 41 percent); 16 percent economic (norm 1 percent). Population at record high for February; scattered, heavy infestation may be expected in all districts. Highest districts east and south. YELLOW SCALE (Aonidiella citrina) infested 42 percent of groves (norm 8 percent); 7 percent economic (norm 1 percent). Population at record high for February but few infestations will be important. Highest district central. DICTYOSPERMUM SCALE (Chrysomphalus dictyospermi) infested 24 percent of groves; 6 percent with moderate to heavy infestations. This scale insect became more numerous in past year. Dictyospermum scale often occurs on leaves and fruit along with red scale and yellow scale. WHITEFLY population higher than average and will remain high. Unaspis citri and Pinnaspis strachani more abundant than in prior years although their distribution is confined to certain areas. BLACK SCALE (Saissetia oleae) at normal level. BROWN SOFT SCALE (Coccus hesperidum), FLORIDA RED SCALE (Chrysomphalus aonidum), MEALYBUGS, SIX-SPOTTED MITE (Eotetranychus sexmaculatus) and APHIDS at below normal February levels. (W. A. Simanton (Citrus Expt. Sta., Lake Alfred)).

CHAFF SCALE (Parlatoria pergandii) - CALIFORNIA - Heavy on orange trees in Nicolaus, Sutter County; this is first record for county and only known field infestation in northern area. (Cal. Coop. Rpt.).

OLIVE SCALE (Parlatoria oleae) - CALIFORNIA - Heavy on loquat tree in Orange Cove, Fresno County. (Cal. Coop. Rpt.).

CALIFORNIA RED SCALE (Aonidiella aurantii) - CALIFORNIA - Adults heavy on grapefruit trees in Yuba City, Sutter County, and Woodland, Yolo County. (Cal. Coop. Rpt.).

COTTONY-CUSHION SCALE (Icerya purchasi) - CALIFORNIA - Heavy on citrus trees in Martinez, Contra Costa County. (Cal. Coop. Rpt.).

WHITE PEACH SCALE (Pseudaulacaspis pentagona) - FLORIDA - Severe on stem of persimmon at Lake Monroe, Seminole County. (Youtsey, Mar. 3).

CITRUS RED MITE (Panonychus citri) - CALIFORNIA - Occurring on citrus in Coachella Valley, Riverside County. Populations fairly general and sufficient to require treatment. This mite has not previously inhabited desert citrus areas. (D. A. Avis).

WESTERN FLOWER THRIPS (Frankliniella occidentalis) - CALIFORNIA - Adults light on almond blossoms in Sonora, Tuolumne County. (Cal. Coop. Rpt.).

MEXICAN FRUIT FLY (Anastrepha ludens) - ARIZONA - Trappings with Steiner and McPhail traps negative in Yuma County. (Ariz. Coop. Sur.).

TRUCK CROP INSECTS

Second Beet Leafhopper Survey in Desert Areas of Central Arizona, Southeastern California and Southern Nevada and Utah. Survey for beet leafhopper (Circulifer tenellus) made in breeding grounds February 24-March 6. Data indicate that additional population buildup will occur and movement to cultivated districts of these areas will be heavy. It is also expected to be heavy in eastern Utah and western Colorado. Movement into northern Utah and western Nevada expected to be moderate to heavy. Host plants hardened, drying or dead in most areas south of 34th parallel, but in fair to good condition north of that line. Precipitation in last week of February and early March should help sustain host plants, particularly in those areas north of 34th parallel. (PPC, West. Reg.).

Potato Psyllid Survey, Spring Breeding Areas of Arizona and California - 1964

The 1964 potato psyllid (Paratrioza cockerelli) survey was conducted March 2-5 in the overwintering areas of Arizona and California. Weather conditions over much of the area surveyed have apparently been unfavorable for development of wild Lycium, preferred host plant in the breeding area. Lycium plants in both the Tucson-Phoenix and Blythe-Barstow areas relatively void of foliage. Extremely dry conditions encountered throughout desert area. A few specimens collected at most stops but no heavy populations found at any point. Weather during first two days of survey was cold, with hard, gusty winds. Last 2 days clear, warm and calm. Comparison of populations found during spring surveys 1958 through 1964 shown on following table.

Potato Psyllid Survey on Overwintering Host
Average No. per 100 Sweeps

State	District	1964	1963	1962	1961	1960	1959	1958
Arizona	Phoenix-Tucson	158	715	2236	149	665	992	93
California	Blythe-Barstow	100	185	909	41	282	237	96

Survey indicates particularly light infestation this season. (PPC, West. Reg.).

BEET ARMYWORM (Spodoptera exigua) - CALIFORNIA - Medium to heavy on young sugar beets in Huntington Beach, Orange County. (Cal. Coop. Rpt.).

BLACK CUTWORM (Agrotis ipsilon) - CALIFORNIA - Medium to heavy on young sugar beets in Huntington Beach, Orange County. (Cal. Coop. Rpt.).

VARIEGATED CUTWORM (Peridroma saucia) - ARKANSAS - Larvae, probably this species, damaging tomato plants in coldframe in Lincoln County. (Ark. Ins. Sur.).

CUTWORMS - OKLAHOMA - Causing considerable damage in home gardens in Bryan County. (Okla. Coop. Sur.).

A DARKLING BEETLE (Blapstinus sp.) - CALIFORNIA - Medium to heavy on young sugar beets in Huntington Beach, Orange County. (Cal. Coop. Rpt.).

CABBAGE APHID (Brevicornye brassicae) - ARIZONA - Small numbers found on cabbage in Yuma County; heavier infestations on mustards along borders and ditches. (Ariz. Coop. Sur.). FLORIDA - Caused light to heavy damage to 8 percent of 200 cabbage plants at Sanford, Seminole County. (Desin).

MELON APHID (Aphis gossypii) - ARIZONA - Medium on lettuce fields in Yuma and Maricopa Counties. Some fields treated. (Ariz. Coop. Sur.).

GREEN PEACH APHID (Myzus persicae) - ARIZÒNA - Continues light on lettuce and cabbage in Yuma and Maricopa Counties. (Ariz. Coop. Sur.).

POPLAR PETIOLE GALL APHID (Pemphigus populitransversus) - TEXAS - Light to heavy, widespread populations on cabbage in Hildalgo County. (Meisch).

APHIDS - TEXAS - Moderate to heavy and requiring chemical control in parts of Hidalgo County on tomato plants. (Todd).

ONION THRIPS (Thrips tabaci) - TEXAS - Light, local infestations reported on onions in Wells County; average 1 per 3 plants. (Tex. Coop. Rpt., Jones).

A LEAF MINER FLY (Liriomyza sp.) - FLORIDA - Caused light to moderate damage of all of 200 celery plants inspected at Sanford, Seminole County. (Desin).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

PALES WEEVIL (Hylobius pales) - ARKANSAS - Activity increasing; collections mostly this species presently. (Ark. Forest Pest Rpt., Mar.).

ENGRAVER BEETLES (Ips spp.).- ARKANSAS - Heavy buildup of Ips spp., especially I. avulsus, occurred in late fall; dying trees evident now. Activity of Ips. spp. and black turpentine beetle (Dendroctonus terebrans) likely to increase rapidly as temperatures rise because of high carryover through winter. (Ark. Forest Pest Rpt., Mar.).

A BARK BEETLE (Pityophthorus carmeli) - CALIFORNIA - Heavy on twigs and bark of Torrey pines in Del Mar, San Diego County. (Cal. Coop. Rpt.).

PINE TIP MOTHS - ARKANSAS - Emergence expected in southern area; first spray application for maximum protection of ornamental pines recommended last week of March. (Ark. Forest Pest Rpt., Mar.).

SOFT SCALES - CALIFORNIA - Adults of Toumeyella pinicola heavy on Monterey pines in Santa Cruz, Santa Cruz County. Adults of Lecanium cerasorum heavy on pyracantha plants locally in Auburn, Placer County. (Cal. Coop. Rpt.).

CONIFER SAWFLIES - ARKANSAS - Egg hatching expected during first half of March if temperatures normal. (Ark. Forest Pest Rpt., Mar.).

A TYROGLYPHID MITE (Carpoglyphus lactis) - CALIFORNIA - Light on twigs and bark of cedar trees in Madera, Madera County, and medium on Pinus sp. in San Francisco, San Francisco County. (Cal. Coop. Rpt.).

SPRING CANKERWORM (Paleacrita vernata) - MICHIGAN - Adult females emerged generally throughout southern area; observed in maple sap collection pails in Genesee County on March 8. (Newman, Hoffman).

TENT CATERPILLARS (Malacosoma spp.) - TEXAS - M. disstria and probably M. texanum larvae appearing from egg clusters on oak and ash trees in Travis County. Preliminary observations indicate populations may be as high as last years's severe outbreak. (Cook, Newton, Meisch).

CITROPHILUS MEALYBUG (Pseudococcus fragilis Brain* (= P. gahani Green)) - CALIFORNIA - Medium on succulents in nursery in Petaluma, Sonoma County. (Coop. Rpt.).

CITRUS MEALYBUG (Pseudococcus citri) - CALIFORNIA - Medium on Hoya sp. in nursery in Galt, Sacramento County. (Cal. Coop. Rpt.).

LONG-TAILED MEALYBUG (Pseudococcus adonidum) - CALIFORNIA - Medium on miscellaneous fern nursery stock in San Diego, San Diego County, and heavy on gardenia in Reedley, Fresno County. (Cal. Coop. Rpt.).

AZALEA BARK SCALE (Eriococcus azaleae) - NORTH CAROLINA - Noted on azalea in Wayne County. (Wellons, Robertson).

TEA SCALE (Fiorinia theae) - FLORIDA - Severe on leaves of camellia at Jacksonville, Duval County. (King, Mar. 6). NORTH CAROLINA - Noted on camellia at home in Cumberland County. (Brady, Robertson).

EUONYMUS SCALE (Unaspis euonymi) - VIRGINIA - Infested twigs at Hurt, Pittsylvania County. (Rowell, Mar. 5).

MARGARODID SCALES - CALIFORNIA - Xylococculus macrocarpae light on twigs and bark of cedar trees in Madera, Madera County. Adults and eggs of Stomacoccus platani heavy on European sycamore in Mt. View, Santa Clara County. (Cal. Coop. Rpt.).

FOXGLOVE APHID (Acyrthosiphon solani) - CALIFORNIA - Heavy on Dendrobium sp. and Phalaenopsis sp. in orchid house on nursery stock at Altadena, Los Angeles County. (Cal. Coop. Rpt.).

GREEN PEACH APHID (Myzus persicae) - FLORIDA - Moderate on kapok at Homestead, Dade County. (Knowles, Mar. 5). This is a new host record for Florida Division of Plant Industry. (Fla. Coop. Sur.).

WOOLLY APPLE APHID (Eriosoma lanigerum) - CALIFORNIA - Heavy on pyracantha in Monterey, Monterey County. (Cal. Coop. Rpt.).

APHIDS - CALIFORNIA - Essigella californica medium on pine nursery stock in Ramona, San Diego County. (Cal. Coop. Rpt.). NEVADA - Cinara tujafilina heavy on arborvitae in Las Vegas, Clark County. (Bechtel, Zoller). NEW MEXICO - C. tujafilina moderate to heavy on arborvitae in Las Cruces area, Dona Ana County. (N.M. Coop. Rpt.).

CONCHUELA (Chlorochroa ligata) - CALIFORNIA - Adults light on Viburnum sp. in Lincoln, Placer County. (Cal. Coop. Rpt.).

BOXELDER BUG (Leptocoris trivittatus) - TEXAS - Causing concern to homeowners in Kerr County. (Rector).

ORANGE TORTRIX (Argyrotaenia citrana) - CALIFORNIA - Larvae medium on Podocarpus sp. growing stock in Petaluma, Sonoma County. (Cal. Coop. Rpt.).

BAGWORM (Thyridopteryx ephemeraeformis) - ALABAMA - Numerous eggs present but not hatching. (McQueen).

A PSYCHID MITE (Apterona crenulella) - NEVADA - Overwintering forms present in Carson City, Ormsby County; this is a new county record. Previously collected in Elko County at Lamoille in 1955. (Bechtel, Martinelli, Mar. 3).

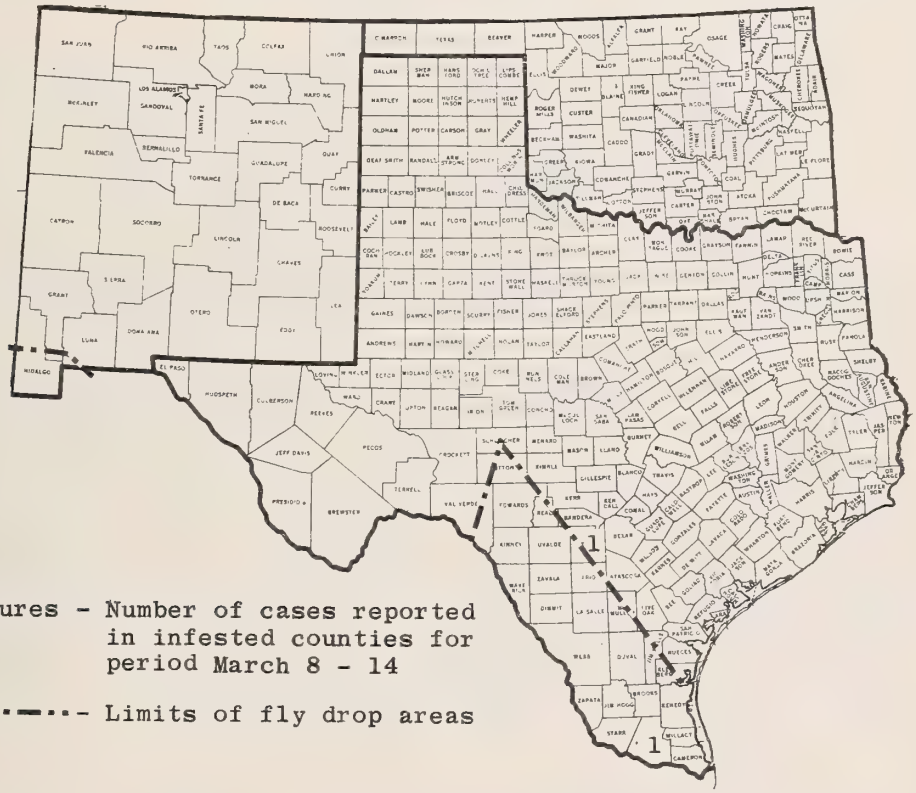
PRIVET MOTH (Brevipalpus obovatus) - CALIFORNIA - Adults heavy on leaves of azalea growing stock in San Diego and Leucadia, San Diego County. (Cal. Coop. Rpt.).

* DeLotto, G.-1958. Brit. Mus. (Nat. Hist.) Bul. 7(3): 96

INSECTS AFFECTING MAN AND ANIMALS

STATUS OF THE SCREW-WORM (Cochliomyia hominivorax) IN THE SOUTHWEST

Two cases of myiasis have recently been disclosed in Texas. The first case found in dehorning wound of cow near Edinburg, Hidalgo County, March 11. Second case found in herd near Castroville, Medina County. The herds have been treated with a pesticide and the areas involved are receiving extra sterile screw-worm flies each week to supress outbreaks. Texas livestock producers submitted 81 samples which were not screw-worms during the period March 8-14. Total of 89,336, 850 sterile screw-worms were released during this period. (Anim. Dis. Erad. Div.).



Figures - Number of cases reported in infested counties for period March 8 - 14

-·-·-·- Limits of fly drop areas

COMMON CATTLE GRUB (Hypoderma lineatum) - OKLAHOMA - Adult activity evident around cattle in Payne County. (Okla. Coop. Sur.). COLORADO - Averaged 16 grubs per head on untreated cattle in Weld County. (Hantsbarger).

HORN FLY (Haematobia irritans) - OKLAHOMA - First occurrence of season observed on cattle in Payne County; averaged under 1 per animal. (Okla. Coop. Sur.).

MOSQUITOES - MARYLAND - First instars of Aedes canadensis collected on March 6 at College Park, Prince Georges County. (U. Md., Ent. Dept.). FLORIDA - Aedes vexans and A. mitchellae generally distributed and causing some annoyance in Gainesville area, Alachua County. Specimens of both species taken in suburban areas and golf courses. A. vexans taken in semienclosed grocery biting man. (Mead, Mar. 6-11).

SHEEP KED (Melophagus ovinus) - PENNSYLVANIA - Much wool loss reported in Montgomery County. (Cole, Feb. 7).

CATTLE LICE - OKLAHOMA - Several species continue moderate on some herds in Payne County (north central); light to moderate in Le Flore County (east central); and heavy in Marshall County (south central). (Okla. Coop. Sur.).

HUMAN FLEA (Pulex irritans) - NEVADA - Heavy in home in Hazen, Churchill County; caused severe annoyance to occupants. Moderate reaction on one person. This is first ARS record for State. (Bechtel, Feb. 20).

TROPICAL RAT MITE (Ornithonyssus bacoti) - CALIFORNIA - Light in office in Woodland, Yolo County. (Cal. Coop. Rpt.).

HOUSEHOLD AND STRUCTURAL INSECTS

WHITE-MARKED SPIDER BEETLE (Ptinus fur) - COLORADO - Heavy around foundations of home in Fort Collins; most noticeable on south exposure during milder weather. Invaded home. Det. by T. O. Thatcher. (Simpson).

ELM LEAF BEETLE (Galerucella xanthomelaena) - OKLAHOMA - Adults becoming active in hibernation quarters as temperatures increase. (Okla. Coop. Sur.).

CLUSTER FLY (Pollenia rudis) - MARYLAND - Adults continue annoyance in homes in Baltimore and Prince Georges Counties. (U. Md., Ent. Dept.). UTAH - Several hundred adults and 2 dozen wasps infesting apartment at Logan Cache County. (Knowlton).

FLIES - MISSOURI - Musca autumnalis, M. domestica and some blow flies found swarming in attic of home in Ray County, west central. (Houser, Thomas, Wood).

BOXELDER BUG (Leptocoris trivittatus) - DELAWARE - Many homes in several areas of New Castle County invaded. (MacCreary). MARYLAND - Adults abundant on sunny exposures of building in Towson, Baltimore County. (U. Md., Ent. Dept.). VIRGINIA - Adults common in and around homes at Chincoteague, Accomack County, (Rowell, Mar. 3), and Madison Heights, Amherst County (Tarpley, Mar. 3). NORTH CAROLINA - Nuisance around homes in Buncombe, Gaston, Union, Northampton and Durham Counties. (Robertson, Mount). MICHIGAN - Continues troublesome in homes in Ingham County. (Dowdy). OKLAHOMA - Active around homes in Cleveland County. (Okla. Coop. Sur.). UTAH - Invading number of homes in Holladay-Draper area, Salt Lake County; at Logan, Cache County; and Bountiful area, Davis, County. (Knowlton).

COCKROACHES - CALIFORNIA - Medium population, probably Supella supellectilium, in home in Elk Grove, Sacramento County. (Cal. Coop. Rpt.). UTAH - S. supellectilium infesting several apartments at Logan, Cache County. Blatta orientalis infesting number of homes in Bountiful-Centerville area, and Blattella germanica noted in several restaurants and homes in Layton-Kaysville area, Davis County. (Knowlton, Rogers). COLORADO - B. orientalis reported in Alamosa County. (Hantsbarger). MARYLAND - Supella supellectilium infesting 2 homes in Prince Georges County. (U. Md., Ent. Dept.).

PAVEMENT ANT (Tetramorium caespitum) - MARYLAND - Winged forms active in basement of home at Sandy Spring, Montgomery County. (U. Md., Ent. Dept.).

LARGER YELLOW ANT (Acanthomyops interjectus) - NORTH CAROLINA - Found in basement of Wake County home. (Mount).

CLOVER MITE (Bryobia praetiosa) - CALIFORNIA - Heavy populations invading home in Willows, Glenn County. (Cal. Coop. Rpt.). NORTH CAROLINA - Nuisance around homes in Wake and Rutherford Counties. (Robertson, Mount). MARYLAND - Caused annoyance by entering home at Belair, Prince Georges County. (U. Md., Ent. Dept.).

AN ANOBIID BEETLE (Nicobium castaneum) - FLORIDA - Damaged pine sill in home in Gainesville, Alachua County. Det. by L. A. Hetrick. (Fla. Coop. Sur.).

SUBTERRANEAN TERMITES (Reticulitermes spp.) - MARYLAND - Adults swarming at several localities in Price Georges County. (U. Md., Ent. Dept.). NORTH CAROLINA - R. flavipes swarming to outside of building in Wake County March 6. Recent swarms in basement of home noted March 10. Alates noted in Pitt and Duplin Counties, March 3 and 6. (Mount, Robertson). COLORADO - Reticulitermes spp. collected in Denver (Poyner) and winged forms noted at Fort Collins (Jenkens). NEVADA - Reticulitermes sp. medium in home in Reno, Washoe County. (Ting).

TERMITES - PENNSYLVANIA - Reports of winged forms in homes noted. (Udine).

STORED-PRODUCT INSECTS

KHAPRA BEETLE (Trogoderma granarium) - ARIZONA - Infestation found in grain storage at feedlot in Gila Valley, Yuma County. Second infestation also found on hog farm at Yuma that was using screenings from infested feedlot. (Ariz. Coop. Sur.).

SAW-TOOTHED GRAIN BEETLE (Oryzaephilus surinamensis) - CALIFORNIA - Adults heavy in stored barley in Butler bins in Grimes, Colusa County; adults causing heavy damage to farm storage. (H. Shaffer, L. Jensen).

A SPIDER BEETLE (Ptinus verticalis)- CALIFORNIA - Medium on safflower seed for stock feed in Corcoran, Kings County. (Cal. Coop. Rpt.).

A MEALWORM (Tenebrio sp.) - TEXAS - Moderate, local infestation in stored cottonseed meal and cake in Potter County. (Rummel).

BENEFICIAL INSECTS

LADY BEETLES - OKLAHOMA - Hippodamia convergens adults becoming quite active in some alfalfa and small grain fields. (Okla. Coop. Sur.). ALABAMA - Cycloneda sanguinea egg masses now being deposited on pine needles in central area where aphids persisted all winter. (McQueen). FLORIDA - Collections from 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County, included 1 adult Hippodamia convergens, 5 adult Cycloneda sanguinea and 7 unspecified lady beetle larvae. (Mead).

GREEN LACEWINGS (Chrysopa spp.) - OKLAHOMA - Chrysopa sp. becoming quite active in some alfalfa and small grain fields. (Okla. Coop. Sur.). ALABAMA - C. oculata adults becoming quite numerous on pines. (McQueen). FLORIDA - Larvae of unspecified species noted in Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

BROWN LACEWINGS (Micromus spp.) - ALABAMA - Adults becoming quite numerous on pines. (McQueen). FLORIDA - One M. subanticus collected from 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead)

DAMSEL BUGS (Nabis spp.) - OKLAHOMA - Becoming quite active in alfalfa and small grains. (Okla. Coop. Sur.). FLORIDA - Three adults collected from 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

A FLOWER BUG (Orius insidiosus) - OKLAHOMA - Becoming quite active in some alfalfa and small grain fields. (Okla. Coop. Sur.).

A BIG-EYED BUG (Geocoris punctipes) - FLORIDA - Five adults taken on 200 sweeps on Hairy Peruvian alfalfa at Gainesville, Alachua County. (Mead).

MISCELLANEOUS INSECTS

CITRUS WHITEFLY (Dialeurodes citri) - CALIFORNIA - Survey continues in peripheral areas in city of Sacramento, Sacramento County; 5 new, very light infestations found. Treatment continues in known infested and buffer areas and will be completed well in advance of adult emergence if weather permits. Post-spray mortality counts show satisfactory kill in all cases. (Cal. Coop. Rpt.).

LESSER MEALWORM (Alphitobius diaperinus) - PENNSYLVANIA - Adults and larvae numerous in chicken manure under cages at Sunbury, Northumberland County. (Gesell, Feb. 25).

A BARK BEETLE (Pseudopityophthorus pubipennis) - CALIFORNIA - Medium in home in Redding, Shasta County; these infestations usually come from oak firewood. (Cal. Coop. Rpt.).

A LONG-HORNED BEETLE (Neoclytus sp.) - MARYLAND - Adults collected near fireplace wood in home at Bel Air, Harford County. (U. Md., Ent. Dept., Mar. 6).

A HELEOMYZID FLY(Pseudoleria sp.) - MASSACHUSETTS - Reported breeding in large numbers in decomposing organic waste material at Holyoke, Hampden County, and Worcester, Worcester County. (Wave).

A DRYWOOD TERMITE - DELAWARE - Undetermined species heavy in 2 wicker baskets in home in New Castle County. (Burbutis, MacCreary).

LIGHT TRAP COLLECTIONS

	Temperature °F	Precipitation	Type of trap *	Agrotis ipsilon (black cutworm)	Carpocapsa pomonella (codling moth)	Chorizagrotis auxiliaris (army cutworm)	Estigmene acrea (salt-marsh caterpillar)	Faronta diffusa (wheat head armyworm)	Feltia subterranea (granulate cutworm)	Heliothis virescens (tobacco budworm)	Heliothis zea (bollworm, corn earworm)	Laphygma frugiperda (fall armyworm)	Loxostege commixtalis (alfalfa webworm)	Loxostege similalis (garden webworm)	Loxostege sticticalis (beet webworm)	Ostrinia nubilalis (European corn borer)	Peridroma saucia (variegated cutworm)	Prodenia ornithogalli (yellow-striped armyworm)	Protoparce quinquemaculata (tomato hornworm)	Protoparce sexta (tobacco hornworm)	Pseudaletia unipuncta (armyworm)	Spodoptera exigua (beet armyworm)	Trichoplusia ni (cabbage looper)	Major crop **
CALIFORNIA																								
Davis 3/7-13																3								Misc.
FLORIDA																								
Gainesville 3/10			BL					11			1									2				
GEORGIA																								
Tifton 3/5-11			BL							0	2							0	0					
MISSISSIPPI																								
Stoneville 3/7-13	37-81	1.34"	MV	7							1					5	1			1				
Stoneville 3/7-13	37-81	1.34"	BL	3			1				2					4	3			6				
SOUTH CAROLINA																								
Charleston 3/9-15	41-76	0.77"	BL	3			0		3	0	0	0				1	0	0	0	14			0	
Clemson 3/1-6																	1							
Clemson 3/7-13																	1							
TEXAS																								
Brownsville 3/5-11			5 BL	52			12		296	1	150	37		304		67	8	3	0	109			71	

* BL = blacklight; I = incandescent; MV = mercury vapor ; O = other

** alf. = alfalfa; beet = garden beet and/or sugar beet; cole = cole crops (crucifers); cott. = cotton; FC = field corn; grain = small grains; leg. = legumes (unspecified); lett. = lettuce; pean. = peanut; pepp. = pepper; pot. = potatoes; SC = sweet corn; sol. = solanaceous plants (unspecified); soy. = soybean; TC = truck crops (unspecified or mixed); tob. = tobacco; tom. = tomato.

SUMMARY OF INSECT CONDITIONS IN HAWAII - 1963

Submitted by the Hawaiian
Entomological Society *

Highlights

SOUTHERN GREEN STINK BUG spread to the islands of Hawaii, Maui, Molokai and Lanai. Damage to various vegetable, fruit, nut and ornamental plants was widespread. Two species of parasites are well established on Oahu and becoming established on neighboring islands. A TARO LEAFHOPPER (Tarophagus proserpina) was discovered for the first time on Molokai. A BARK BEETLE (Xylosandrus compactus (=Xyleborus morstatti)) was found on avocado and Isabella grape twigs on Oahu. A GIANT AFRICAN SNAIL (Achatina fulica) was found at Hakalau, Hawaii, for the first time and eradicative measures were instigated; and found on Molokai for first time also. An intentionally introduced STEM-BORING WEEVIL (Microlarinus lypriformis) was very destructive to puncture-vine (Tribulus terrestris) and nohu (T. cistoides) on Kauai.

Cereal and Forage Insects

A BILLBUG (Sphenophorus venatus vestitus) continued to damage zoysia lawns on Oahu, especially in the Waialae-Nui area; at Kalaheo, Kauai, it caused severe damage to zoysia. LAWN ARMYWORM (Spodoptera mauritia acronyctoides) plagued homeowners with Bermuda grass lawns and heavily damaged Tifton 358 grass lawns on Oahu. The species was sporadically active throughout the year on Maui, causing severe damage at times. A moderate outbreak of ARMYWORM (Pseudaletia unipuncta) occurred at the Kahua Ranch, island of Hawaii, near the end of the year. RHODES-GRASS SCALE (Antonina graminis) was very active on Maui near sea level in the summer. An outbreak of JAVA SUGARCANE LEAF MITE (Oligonychus exsiccator) was reported at Moloaa, Kauai.

Fruit Insects

An OLETHREUTID MOTH (Cryptophlebia ombrodelta) was reported attacking seeds of litchi (Litchi chinensis) and causing fruit drop on Kauai. A BARK BEETLE (Xylosandrus compactus (=Xyleborus morstatti)) damaged twigs of avocado and Isabella grape on Oahu. A light infestation of a PHYCITID MOTH (Cryptoblabes aliena) occurred on macadamia nut blossoms on Oahu.

Truck Crop Insects

SOUTHERN GREEN STINK BUG (Nezara viridula var. smaragdula) caused widespread damage to orchids (Dendrobius spp., Vanda spp. and Cattleya spp.), hibiscus, litchi, mango, macadamia nuts, citrus, tomatoes, yardlong beans, soybeans, pole beans, string beans, watercress, daikon, broccoli and other cruciferous plants over the island of Oahu. The species has extended its range around the island of Oahu and from sea level to 1,265 feet elevation. The stink bug reached the neighbor islands of Hawaii (in June), and Maui, Molokai and Lanai (in August) this

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* Coordinated by the Entomology Branch, State Department of Agriculture with the University of Hawaii, Hawaiian Sugar Planters' Association Experiment Station and Pineapple Research Institute of Hawaii cooperating.

year. Damage to soybeans, string beans, eggplant and hibiscus occurred on Hawaii. Populations on Molokai, Lanai and Maui were small but widespread. Some feeding damage was observed on eggplant, daikon and tomatoes. Heavy damage to macadamia nuts was recorded on Oahu. A PARASITIC TACHINA FLY (Trichopoda pennipes), a parasite of adults of southern green stink bug, has been released on all infested islands and established on Oahu, Kauai and Hawaii. A SCELIONID WASP (Telenomus basalis), an egg parasite of the same pest, has been released on all infested islands and established on Oahu and Hawaii.

A CUTWORM (Agrotis dislocata) (a tentative identification) caused severe damage to corn, broccoli, potato, nasturtium, and other hosts, at the 1,500-3,000 foot level on Maui; a virus disease exerted some control. A TARO LEAFHOPPER (Tarophagus proserpina) was found on the island of Molokai for the first time. Large numbers appeared on taro (Colocasia esculenta) on Kauai in November and caused considerable damage in Waimea Valley in December. The anticipated buildup of a PREDACEOUS CAPSID BUG (Cytorhinus fulvus), an egg predator, did not materialize, perhaps because of unusually cold weather. The leafhopper was very active on taro in windward Oahu the latter part of the year. VEGETABLE WEEVIL (Listroderes costirostris obliquus) was extremely active at higher elevations on Maui and caused severe damage to some vegetable and flower crops. Celery roots on Hawaii were heavily infested by a WEEVIL (Brachyrhinus cribricollis) in a field at Waimea, island of Hawaii, which had been previously planted with burdock. A LEAF BEETLE (Lema trilineata californica) was very active on Kauai, and moderate to severe damage was reported on poha (Physalis peruviana). BLACK CUTWORM (Agrotis ipsilon) caused heavy damage to vegetable crops on Maui early in the year. MELON FLY (Dacus cucurbitae) and ORIENTAL FRUIT FLY (Dacus dorsalis) caused severe damage to tomatoes and cucumbers on Kauai. A GRASSHOPPER (Atractomorpha ambigua) occurred in large numbers on Kauai and was destructive to daikon and Chinese green mustard cabbage. A SYRPHID FLY (Eumerus marginatus) caused severe damage to ginger (Zingiber officinale) at Keaau and Papaikou, island in Hawaii.

Forest, Ornamental and Shade Tree Insects

An APHID (Cinara carolina) infestations ranged light to moderate on loblolly pine (Pinus taeda) on Maui. FULLER ROSE BEETLE (Pantomorus godmani) and GREENHOUSE THRIPS (Heliothrips haemorrhoidalis) infested slash pine (Pinus elliottii) on Kauai; damage was light from both species. A NOCTUID MOTH (Polydesma umbricola) was active on monkeypod (Samaea saman) flushes during the spring on Oahu. Larvae of another NOCTUID MOTH (Ascalapha odorata) moderately damaged monkeypod foliage on Maui. An OLETHREUTID MOTH (Cryptophlebia ombrodelta) damaged shower trees (Cassia spp.) in Paia and Makawao on Maui; on Kauai this species attacked twigs and seeds of several species of Cassia, including C. occidentalis and C. bicapsularis. An unusually heavy infestation of a KOU MOTH (Ethmia colonella) was observed on kou (Cordia subcordata) at Kawaihae and Honaunau (City of Refuge), island of Hawaii. The species was very active on Cordia subcordata and C. sebestana at Poipu, Kauai. COCONUT LEAF ROLLER (Hedylepta blackburni) occurred in large numbers on palms at Manuka Park, South Kona, Hawaii island. It caused moderate damage to coconut on Maui.

At Kukuihaele, island of Hawaii, a heavy infestation of TAHITIAN COCONUT WEEVIL (Diocalandra taitensis) was observed on young terminal shoots of coconut. Severe attack to seeds of koa (Acacia koa) by a COFFEE-BEAN WEEVIL (Araecerus fasciculatus) was noted at Waiakea Forest Reserve, Hawaii island. A NOCTUID MOTH (Achaea janata) was very active on castor-bean, kukui (Aleurites moluccana) and rose during March on Maui. In many areas of Oahu, outbreaks of this noctuid on castorbean and croton (Codiaeum spp.) were observed. It was noted on castor-bean at Waimea and Kona, island of Hawaii.

Adults of a SCARAB (Protaetia fusca) heavily infested fruits of noni (Morinda citrifolia) at the City of Refuge, Honaunau, Hawaii island, and fruits of litchi

and mango on Oahu. Moderate numbers of a LEAF BEETLE (Lema trilineata californica) fed on cup-of-gold (Solandra nitida) on Hawaii. An ORCHID WEEVIL (Orchidophilus aterrimus) continued abundant in vanda fields on the island of Hawaii, and another species, O. peregrinator, was very active on canes of dendrobium and shoots of vanda orchids on Oahu. SOUTHERN GREEN STINK BUG (Nezara viridula var. smaragdula) continued to cause serious damage to orchids, hibiscus and many other ornamentals on Oahu. A STINK BUG (Brochymena quadripustulata) reappeared on a farm at Lualualei, Oahu, after dropping out of sight for a year.

Insects Affecting Man and Animals

NORTHERN CATTLE GRUB (Hypoderma bovis) was quite active on dairy cows at Naalehu, island of Hawaii; it was reported from Hanalei and Poipu on Kauai; and meat inspectors reported frequent grubs in newly dressed hides. Increasing activity of northern cattle grub and COMMON CATTLE GRUB (H. lineatum) was noted on Maui. Heavy populations of a CALLIPHORID FLY (Phaenicia sericata) were observed in Kona, Hawaii island; newly born calves were attacked. STABLE FLY (Stomoxys calcitrans) was very troublesome to cattle and horses in the Ewa area on Oahu.

An outbreak of a CALLIPHORID FLY (Rhinia apicalis) occurred in Hilo, Hawaii, causing considerable annoyance in restaurants. A VINEGAR FLY (Drosophila hydei) appeared in enormous numbers on Kauai from March to May and was a constant nuisance in homes. Swarms of a SCIARID MIDGE (Sciara hardyi) invaded homes, schools and business offices in the Waianae area of Oahu. A SAP BEETLE (Carpophilus humeralis) (also called "pineapple bug") was troublesome to homeowners who resided near abandoned pineapple fields in the Waipahu area, Oahu. FIRE ANT (Solenopsis geminata var. rufa) was moderately active at Kihei, Maui. A CARPENTER ANT (Camponotus variegatus hawaiiensis) continued to annoy many homeowners on Oahu. A SPIDER (Chieracanthium diversum) bit several persons, necessitating medical treatment.

Household and Structual Insects

FORMOSAN SUBTERRANEAN TERMITE (Coptotermes formosanus) was discovered in Kahului and Wailuku, Maui, in April. An eradicative program was instituted.

Beneficial Organisms

A CARNIVOROUS SNAIL (Gonaxis quadrilateralis), which attacks Achatina fulica (a giant African snail), is established on an area of over 50 acres in the Tantalus-Makiki area of Oahu and has greatly reduced the A. fulica populations. Five species of egg parasites of southern green stink bug were introduced from Australia and the West Indies, and two forms of a PARASITIC TACHINA FLY (Trichopoda pennipes), a parasite of adults of southern green stink bug, were introduced from the West Indies and Florida. Two parasites, Telenomus basalis (a scelionid wasp) and Trichopoda pennipes (a tachina fly) (West Indian), are established and giving high parasitism in some areas. A COCCINELLID BEETLE (Hyperaspis trilineata) was introduced for the control of pink sugarcane mealybug (Trionymus sacchari). A MYMIRID WASP (Patasson calendrae), an egg parasite, was released against Sphenophorus venatus vestitus (a billbug). A PARASITIC APHELINID (Aphytis holoxanthus) was introduced for the control of Florida red scale (Chrysomphalus aonidum). A PARASITIC TACHINA FLY (Eucelatoria armigera) was released against armyworms and cutworms. An epizootic of a cytoplasmic polyhedrosis virus disease occurred during March and April on a PYRALID MOTH (Cactoblastis cactorum), decimating populations of the insect on Oahu. A STEM-BORING WEEVIL (Microlarinus lypriformis) of puncture-vine (Tribulus terrestris) was introduced from California and Arizona, and quickly became established on Kauai, where it became very destructive to puncture-vine and the related nohu (T. cistoides). Another STEM-

BORING WEEVIL (Apion antiquum) continued to devastate the weed Emex australis on Hawaii. A CERAMBYCID STEM BORER (Plagiohammus spinipennis) of lantana was found established in new areas on the island of Hawaii. A LEAF-MINING HISPID (Octotoma scabripennis) of lantana was found established on Hawaii for the first time, nine years after its release.

Miscellaneous Pests

A GIANT AFRICAN SNAIL (Achatina fulica) was found at Hakalau, Hawaii, in April and eradicative measures were instituted. The snail was also discovered for the first time on Molokai in September. Considerable damage to soybeans by this snail was reported from Waimanalo, Oahu, in December. A heavy infestation of MEADOW SPITTLEBUG (Philaenus spumarius) nymphs and adults was observed on the weed, Hamakua pamakani (Eupatorium riparium), at Honomalino, South Kona, island of Hawaii, in September. Considerable wilting was produced on the terminal parts of the plants.

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1963
(continued from page 205)

TOBACCO INSECTS

Highlights:

Tobacco insects, as a group, did not appear to be as serious as in 1962. HORNWORMS were generally not much of a problem and BUDWORMS did not cause any appreciable injury until late in the season. TOBACCO BUDWORM was more of a problem on flue-cured tobacco in Florida, but the reasons are not readily apparent. Budworms were about twice as numerous as the previous year on shade-grown tobacco in the Quincy area of Florida, and BEET ARMYWORM was recorded for the first time on shade-grown tobacco in that area of Florida. CABBAGE LOOPER was more of a general problem in North Carolina than in 1962, and most infestations in Georgia were moderate to heavy. CUTWORMS were more damaging than usual in South Carolina, and they were damaging to shade-grown tobacco at Quincy, Florida. GREEN PEACH APHID was less troublesome generally than in 1962. FLEA BEETLES, predominantly TOBACCO FLEA BEETLE, are expected to be a major problem to shade-grown tobacco in in the Quincy area of Florida in 1964. Tolerance to chlorinated hydrocarbon insecticides is strongly suspected. Tobacco flea beetle was the heaviest and most destructive in Maryland than for several years. SOUTHERN POTATO WIREWORM was more damaging than usual in South Carolina, but damage by this species and TOBACCO WIREWORM was considerably less than in 1962 in North Carolina.

TOBACCO HORNWORM (*Protoparce sexta*) and TOMATO HORNWORM (*P. quinquemaculata*) were among the major tobacco pests observed in southern OHIO during September. Both broods of *Protoparce* spp. were about normal in MARYLAND, with at least one-third of the growers applying treatments for control of these pests. Hornworms were generally light in Pittsylvania County, VIRGINIA, in June and light trap collections were unusually low. Larvae of both species were light to medium on late tobacco in Pittsylvania County in August. Hornworm infestations were relatively low again during 1963 in NORTH CAROLINA. Populations in June and July were lighter at the Border Belt Tobacco Research Station, Whiteville, Columbus County, than in 1962, but after harvest they were somewhat higher. Low numbers of hornworms were found on tobacco in TENNESSEE, and populations in SOUTH CAROLINA were less noticeable than in most past years. Tobacco hornworm populations were also at low levels in the flue-cured tobacco-growing areas of FLORIDA, which is principally from Alachua County northwest through Madison and Hamilton Counties to the Georgia line. Populations of hornworms on shade-grown tobacco in the Quincy area of Florida were almost nonexistent as has been the case for the past five years. The first adult in the Quincy area was caught in a light trap on April 22, 1963, compared with May 3, 1962. Light trap catches in this area showed 23 percent fewer hornworm adults caught in 1963.

POTATO TUBERWORM (*Gnorimoschema operculella*) was worse than usual in some flue-cured tobacco in FLORIDA than at any time in the last 15 years. Two of the hardest hit areas were Archer, Alachua County, and Lake City, Columbia County. Severe infestations were isolated. There seems to be no particular pattern to the appearance of this pest in tobacco fields in Florida.

BUDWORMS (*Heliothis* spp.) were again below normal in MARYLAND, with only a few economic infestations occurring in tobacco. CORN EARWORM (*H. zea*) was of lesser importance on tobacco in OHIO than hornworms, differential grasshopper (*Melanoplus differentialis*) and tobacco flea beetle (*Epitrix hirtipennis*). TOBACCO BUDWORM (*H. virescens*) was the most common tobacco insect in TENNESSEE although a large amount of parasitism of this insect was observed during the season. Tobacco

budworm larvae were generally light on tobacco in Pittsylvania County, VIRGINIA, early in the season, but some damage appeared on late tobacco in the county. Budworms were considerably lower in NORTH CAROLINA at the time of economic infestations than they were in 1962. Corn earworm infestations were light to heavy on tobacco in GEORGIA, especially late in the season. In FLORIDA, tobacco budworm was more of a problem on flue-cured tobacco for reasons not readily apparent. However, at the Gainesville experimental plots, the budworm was lighter on unsprayed tobacco. This seemed due mainly to a high population of predatory and parasitic wasps. On shade-grown tobacco in the Quincy area, budworms were about twice as numerous as in 1962. Total losses to this crop were about 6 percent ($810,000) in 1963, considering all pests. Budworms caused about 1.2 percent of this loss. The outlook for 1964 is for budworms to be more plentiful on shade-grown tobacco.

BEET ARMYWORM (*Spodoptera exigua*) was light to moderate on tobacco in Coffee County, GEORGIA. This was where this species was first found in Georgia. It has since been reported on cotton and peanuts. In FLORIDA, beet armyworm caused about five percent damage ($7,500) to approximately 50 acres of shade-grown tobacco in the Quincy area. This was the first known record of commercial loss to this crop, as well as the first record on shade-grown tobacco.

CABBAGE LOOPER (*Trichoplusia ni*) was more of a general problem on tobacco in NORTH CAROLINA in 1963. Reports of damage to a number of fields were received from Carteret and Pamlico Counties during June and July. Lighter infestations were scattered throughout the other tobacco areas of the State. Infestations in GEORGIA were light to heavy throughout the tobacco-growing area, with most infestations moderate to heavy. Cabbage looper was not as numerous on shade-grown tobacco in the Quincy area of FLORIDA, in fact it was three times less plentiful. Losses to shade-grown tobacco ran about 0.5 percent. Cabbage looper populations are expected to remain about the same in 1964 in this area of Florida.

CUTWORMS were more damaging than usual to tobacco in SOUTH CAROLINA, and *Agrotis* spp. were more numerous on shade-grown tobacco and caused more damage to newly set plants in the Quincy area of FLORIDA than in 1962. Losses to shade-grown tobacco in the Quincy area were about 2.8 percent. Cutworms are expected to be more plentiful in 1964 on this crop at Quincy.

GREEN PEACH APHID (*Myzus persicae*) was the heaviest since 1948 on flue-cured tobacco in experimental plots in FLORIDA. This may have been due to inadequate insecticide programs in the plant beds. Overall, this aphid remained about the same as in recent years on flue-cured Florida tobacco, with no severe outbreaks because of the routine control measures taken. Green peach aphid populations on shade-grown tobacco in the Quincy area were normal, but very little if any loss occurred. Infestations in GEORGIA were light to moderate on tobacco in the plant bed and in the field. Green peach aphid was less abundant in VIRGINIA than in 1962. It was an occasional pest in irrigated fields of tobacco in Pittsylvania County. Infestations were general in all tobacco areas of MARYLAND during late July and August, but only a few heavy to severe infestations were reported. A moderate amount of spraying for aphids was done in Calvert and St. Marys Counties. Green peach aphid was of lesser importance than hornworms, differential grasshopper and tobacco flea beetle in OHIO.

Flea beetles, predominantly TOBACCO FLEA BEETLE (*Epitrix hirtipennis*), caused some concern on shade-grown tobacco in the field in several locations around Quincy, FLORIDA. This was the first commercial loss from flea beetles since 1947. Tolerance to chlorinated hydrocarbon insecticides by flea beetles is strongly suspected. Losses to the crop as a result of flea beetles was estimated at 0.8 percent. It is quite apparent that flea beetles will be the major problem to the shade-growing tobacco farmer during 1964 in Florida. Tobacco flea beetle infestations were light to heavy on tobacco in the field in GEORGIA, and fairly large populations of unspecified FLEA BEETLES were noted on tobacco in some areas of SOUTH CAROLINA towards the last half of the season. Tobacco flea beetle remained at low levels on flue-cured tobacco early in the season in VIRGINIA, but it began

increasing in many tobacco fields, especially nonirrigated ones, in Pittsylvania County in late July. Also in Virginia, PALE-STRIPED FLEA BEETLE (Systena blanda) caused considerable damage to newly set tobacco plants on one farm in Dinwiddie County in May. Tobacco flea beetle numbers were the heaviest and the most destructive to MARYLAND tobacco in several years. Populations were heaviest in mid-June and in mid-August. Tobacco flea beetle was also one of the major tobacco pests observed in southern OHIO during September along with hornworms and differential grasshopper.

TOBACCO WIREWORM (Conoderus vespertinus) and SOUTHERN POTATO WIREWORM (C. falli) damage was considerably less than in 1962 in NORTH CAROLINA. However, severe injury occurred in some fields throughout the Coastal Plain area. The latter species is apparently still confined to the area between and including Columbus and Pamlico Counties. In SOUTH CAROLINA, southern potato wireworm was more damaging to tobacco than usual. Tobacco wireworm infestations were severe locally in several GEORGIA counties. Wireworms, principally Conoderus spp., were rated at approximately the same level on flue-cured tobacco in FLORIDA as in previous years. Conoderus spp. appeared to be on the decline on shade-grown tobacco in the Quincy area, because fewer cases of damage were reported in commercial fields. Some losses were attributed to wireworms in the Quincy area, however.

Light to moderate infestations of VEGETABLE WEEVIL (Listroderes costirostris obliquus) were found on tobacco in the plant bed in GEORGIA; and larvae of this species caused considerable injury to 500 square yards of tobacco plant beds in Pittsylvania County, VIRGINIA, in May. However, reports in MARYLAND of injury by vegetable weevil were below normal. Moderate infestations of WHITE-FRINGED BEETLES (Graphognathus spp.) were found on tobacco in localized parts of several GEORGIA counties.

For the first time in several years, SUCKFLY (Cyrtopeltis notatus) caused concern in several VIRGINIA localities. Light to medium infestations were detected in single fields from late July to early September.

Several other pests were reported troublesome to tobacco locally. In MARYLAND, THRIPS were conspicuous on newly set plants in sections of Anne Arundel, Calvert and Prince Georges Counties, and GARDEN SPRINGTAIL (Bourletiella hortensis) was widespread and abundant during April, but the latter pest caused only light damage to tobacco in plant beds. DIFFERENTIAL GRASSHOPPER (Melanoplus differentialis) was among the major pests of tobacco observed in southern OHIO during September, and CAROLINA GRASSHOPPER (Dissosteira carolina) was the most frequently encountered grasshopper feeding in tobacco fields in WISCONSIN.

In the Quincy area of FLORIDA, insect losses to the shade-grown tobacco crop ran about six percent ($810,000) with cutworms (2.8%), budworms (1.2%), flea beetles (0.8%) and cabbage looper (0.5%) causing the bulk of the damage. About 1.7 percent was lost to wireworms, beet armyworm and other insects.

COTTON INSECTS

Highlights:

BOLL WEEVIL infestations were extremely light during 1963 over a wide area of the cotton belt. Several States that normally report some economic damage, such as North Carolina, Tennessee and Missouri, reported that weevil infestations in 1963 were practically nonexistent. The extreme winter of 1962-63 was probably the major factor in reducing populations in that winter survival was generally very low. The boll weevil appeared to be the most damaging in Texas, especially those areas where adequate controls were not initiated. Also, some spread of

the weevil was reported above the Caprock in west Texas. BOLLWORMS were generally regarded as being the major pest problem of cotton in 1963. Severe damage was recorded in Arizona, New Mexico, Texas and Oklahoma; and heavy infestations existed in Arkansas, Mississippi, Alabama and Georgia. The PINK BOLLWORM was found again in the eradication area of central Arizona and populations increased substantially in Arkansas and Louisiana. The pink bollworm increase was also noticeable in some other infested areas of Arizona, New Mexico, Texas and Oklahoma. CABBAGE LOOPER and SALT-MARSH CATERPILLAR were responsible for considerable damage to cotton in Arizona, and BEET ARMYWORM infestations were mostly light to moderate in Georgia. COTTON LEAFWORM became quite noticeable late in the season, particularly in States west of the Mississippi River. Many severe infestations of LYGUS BUGS developed in all cotton-growing areas of California, and they were among the most damaging pests of cotton in Arizona. SPIDER MITES became abundant in the Carolinas during July and August, and damage was high in some cases. Serious infestations were also reported during June in California. Infestations in other States were more localized although some economic damage was recorded.

The BOLL WEEVIL (Anthonomus grandis) was light during the early part of the season in TEXAS, but as the season progressed, populations became damaging in areas where adequate control measures were not initiated. Boll weevil appeared in several counties above the Caprock in west Texas including Floyd, Crosby, Garza, Briscoe and Lynn. The weevil was also quite heavy in the red rolling plains section of Texas. The containment program in the big bend and El Paso areas of the Rio Grande, which is aimed at preventing the weevil from moving into western cotton-producing areas of the country, was continued in 1963. Boll weevil was generally noneconomic to light throughout the season in OKLAHOMA, except for some localized "hot spots" in the south central area. Only limited controls were necessary in 1963. Some late buildup was noted in southwest Oklahoma, but most cotton had reached maturity before the increase.

Boll weevil was extremely light during 1963 in ARKANSAS. The number of fields with infestations present was comparable with past years; however, the number of weevils present remained very low in general throughout the year making 1963 the lightest boll weevil year in some time. The point-sample method of survey was used by all cotton scouts and is being taught to farmers. The need of insecticidal treatments is based on percent punctured squares and rate of squaring; both of these factors are considered in the point-sample method of survey. On this basis, the percentage of fields needing treatments ranged 0-13.8, with a seasonal average of only 6.0. In the Tallulah area of LOUISIANA, boll weevil was generally light early in the season, but a buildup did occur during the latter part of July when frequent showers made controls difficult and third-generation weevils were common. Cotton needed protection for the remainder of the season. Infestations in MISSISSIPPI were light and relatively late in the season. No weevils were found in many fields during the growing season. Generally speaking, control measures for boll weevil were not needed until August, and then in very few fields. Infestations in MISSOURI were practically nonexistent during 1963. No insecticide applications were made for boll weevil control during the season. Boll weevil was also nonexistent during the growing season in TENNESSEE. It appeared in numbers late in the season but too late to cause any harm. Controls were not necessary for this insect in 1963. This was an unusual situation in view of the fact that over 3,000 weevils went into hibernation in the fall of 1962 in western Tennessee. At planting in the spring of 1963, there were large numbers of weevils around as shown by the catches on the weevil flight traps. At cotton fruiting time, the weevils had disappeared.

The extreme winter of 1962-63 along with other unknown factors evidently had a most serious effect on the winter survival of the boll weevil in ALABAMA. Infestations were lower perhaps than during the past three decades. Only 51 percent of the cotton acreage in Alabama received controls and only an average of

about three applications were made on these acres. The boll weevil was not a problem in the northern half of Alabama, although it did appear by October and November. Infestations in GEORGIA were the lowest observed in several years. As late as mid-August, south Georgia cotton fields had a range of 6-77 percent punctured squares (averaged 38 percent). Emergence of boll weevil from hibernation in SOUTH CAROLINA was lighter than in 1962. Weevils were under control in fields where growers had made application during the rainy periods of late June and early July. As migration began in the Coastal Plain, boll weevil was very light in areas where growers were on regular schedules, especially in community-wide control projects. Where fields had not been protected, counts showed 100 percent of the squares to be damaged by weevils and bollworms. In general, boll weevil caused more damage in the Coastal Plain area than in the Piedmont of South Carolina. Dry weather late in the season tended to hold the pest in check. Winter weather probably had more effect in the Piedmont area than in the Coastal Plain. Heavier fertilization of recent years has the effect of making cotton grow longer and requiring boll protection for another generation. In NORTH CAROLINA, boll weevil numbers were lowest in experimental plots in Scotland County when the plants were in the 8-leaf stage than any time since recording was begun in 1957. Counts at that time were about 25 per acre. Early season infestations were quite low throughout North Carolina and did not begin to increase noticeably until late July. By mid-August, the poorly treated fields in the Coastal Plain had high punctured-square counts, but satisfactory control was being obtained in properly treated fields.

The boll weevil survival surveys in the spring of 1963 indicated that numbers were down in all cotton-producing areas. The average number of weevils per acre of trash was 121 in northeast Louisiana, 452 in central Texas, 13 in Mississippi, 350 in the Piedmont of North and South Carolina, 161 in north central North Carolina, 914 in south central South Carolina and 1,560 in the Coastal Plain of North and South Carolina. The 1963 fall hibernation surveys indicated that, in general, fewer weevils went into hibernation than in the fall of 1962. Only south central South Carolina and northeastern Louisiana had higher average counts of live weevils per acre than in 1962. The average numbers in these areas were 6,319 in south central South Carolina and 7,317 in northeast Louisiana. Counts in other cotton-producing areas were 968 in the Piedmont of North and South Carolina, 10,002 in the Coastal Plain region of North and South Carolina, 1,263 in north central North Carolina, 3,010 in Mississippi, 1089 in Tennessee (McNairy County) and 517 in central Texas.

Heavy, local infestations of FULLER ROSE BEETLE (Pantomorus godmani) were found on cotton in McDuffie County, GEORGIA; and a WEEVIL (Rhyssomatus pruinosus) was collected from cotton in Midland County, TEXAS. Also in Texas, undetermined DARKLING BEETLES damaged cotton in the southern part of the red rolling plains area. PALE-STRIPED FLEA BEETLE (Systena blanda) was noted feeding on cotton in MISSOURI, and another FLEA BEETLE (S. taeniata) was light on cotton in the Antelope Valley of Los Angeles County, CALIFORNIA.

BOLLWORM (Heliothis zea) was late in starting in CALIFORNIA, but heavy, local infestations developed and heavy populations were present until frost. Populations in NEVADA began to increase in Nye County in late August, but infestations were below 1961 and 1962 levels, with only a few fields requiring treatments. Severe damage occurred in ARIZONA after August 1 from the feeding of large populations. Nearly all cotton-growing areas of Arizona reported above normal numbers of the pest. In NEW MEXICO, bollworm was a serious problem in cotton fields in the Pecos and Mesilla Valleys for the second season in a row. Growers found this pest very difficult to control because of the overlapping of generations. During the late summer and fall, it was often possible to find all stages from eggs to full-grown larvae in the cotton fields at one time.

Bollworm and/or TOBACCO BUDWORM (H. virescens) were the most damaging cotton insects during 1963 in TEXAS. Heavy infestations appeared in all areas, with serious damage often occurring before the population could be brought under

control. Infestations of bollworm in OKLAHOMA were becoming common as cotton plants began to square in early July. By late July, populations were increasing in irrigated cotton to high infestation levels which continued throughout the season in most of the irrigated areas of the State. Bollworm and tobacco budworm infestations increased rapidly in MISSOURI beginning the last week of July and increasing until mid-August when approximately 85 percent of the scouted fields were infested. A survey for bollworms (Heliothis spp.), conducted when infestations were at their peak, showed that tobacco budworm made up 3.9 percent of the population.

Bollworms, including both bollworm and tobacco budworm, were the most important pests in ARKANSAS in 1963. Numbers were higher than they have been in any year since any type of records have been kept. Insecticide resistance is on the increase also. Difficulty in control was experienced in many areas. The percentage of fields infested with bollworms ranged from 25.4 to 79.7 with a season average of 56.8. Comparable figures for the last 5-year average ranged 23.0 to 71.6 percent and a seasonal average of 49.5 percent. Larval numbers were high in many cotton fields. Fields with 4-10 larvae per 100 terminals ranged from 2.8 to 32.8 percent. Fields with 11-25 larvae per 100 terminals ranged from less than one to 10.6 percent. Fields with over 25 larvae per 100 terminals ranged from zero to 2.2 percent. Scouts now record damaged squares, and when six percent levels are found, serious bollworm problems exist. The range of fields in this category was 0.6 to 23.9 percent, with a seasonal average of 8.4 percent in 1963.

An extensive study of both bollworm and tobacco budworm was made in Arkansas in 1963. Of 2,798 larvae collected, 5.9 percent were tobacco budworm. Of moth collections made, only 1.9 percent were tobacco budworm, indicating that tobacco budworm is less attracted to light than bollworm. In addition, the collection data indicated that the highest percentage of tobacco budworm larvae were collected in late June and early July, and that tobacco budworm is more numerous in the southwest area than in other areas of the State.

BOLLWORMS (Heliothis spp.) were important pests in the Tallulah area of LOUISIANA. Infestations in the latter part of the summer were the primary problem in cotton fields and controls were necessary to protect the crop. In MISSISSIPPI, bollworm infestations were generally heavy during August and September. This pest caused the most problem with cotton during 1963. Tobacco budworm was present in Mississippi cotton fields all season, but it was most prevalent during the early part of the season in June and July. Several localized infestations were evident in August which caused severe damage to cotton. In TENNESSEE, bollworms were a problem in localized sections of the cotton-growing area. The bollworm complex in ALABAMA was as serious, if not more serious, to the cotton crop than boll weevil. Both bollworm and tobacco budworm were present throughout the State and presented a more difficult control problem than other cotton insects. Infestations in GEORGIA were heavy and more severe than in several years. The first larvae were found the last week of April. Damaging populations continued to be a problem until harvestime. Bollworms have become much more important in SOUTH CAROLINA, especially in the Coastal Plain area. Populations peaked in the late season period. The highest moth count of Heliothis zea in the Florence area was during the week of August 15. The total number of moths caught was two and one-half times the total caught to that date and 10 times the catch of the same week in 1962. In NORTH CAROLINA, bollworms were about normal for the year. Terminal infestations of 10-20 percent were noted in some poorly treated fields in the latter half of August and 0-4 percent were noted in well-treated fields. About 10 percent of the bolls were damaged in untreated plots in Scotland County in 1963.

Heavy PINK BOLLWORM (Pectinophora gossypiella) infestations were found in Graham County, ARIZONA, during the first week of October. Later surveys indicated nearly all fields in Graham, Cochise and Greenlee Counties, Arizona, were infested. Increased survey efforts in Maricopa and Pinal Counties, same State, revelaed many infestations in areas where eradicative treatments had been applied for this pest.

In NEW MEXICO, unusually general, heavy infestations were found in Eddy County cotton fields. The heaviest infestations were found in southern Eddy County, becoming lighter to the north. Larvae were found in cotton fields in southern Eddy County in July, which indicated a possible buildup. Pink bollworm appeared in the coastal bend area of TEXAS in the summer and infestations were heavy by the latter part of the season. This insect also built up to heavy numbers in the trans-Pecos area of Texas. Infestations in OKLAHOMA showed a general increase over the past year based on gin-trash and lint-cleaner inspections. Of the 36 counties inspected, one was negative, 25 lightly infested (fewer than 1 per 100 bushels) and 10 showed medium infestations (1-100 larvae per bushel). Surveys indicated that pink bollworm populations increased substantially in LOUISIANA and ARKANSAS. In Louisiana, only 31 larvae were found in four parishes during the entire 1962 season; however, in 1963 pink bollworm was found in 17 parishes with nearly as many larvae found in De Soto Parish alone as were found in the entire State the preceding year. In Arkansas, 302 larvae were found in 21 counties during the year, the highest number of larvae since 1958. In 1962, only 2 pink bollworm larvae were found in one county. Gin-trash, lint-cleaner and light-trap inspections in MISSOURI, NEVADA and CALIFORNIA were negative in 1963.

COTTON SQUARE BORER (*Strymon melinus*) was noted feeding on cotton in MISSOURI and was a minor pest locally in TEXAS. Occasional larvae were also found in Eddy, Chaves and Dona Ana Counties, NEW MEXICO, during the summer, and many of these larvae were parasitized. EUROPEAN CORN BORER (*Ostrinia nubilalis*) infestations were common in fields of late cotton during the latter part of the season in MISSOURI. Larvae were observed in both stalks and bolls and, in several instances, were observed in bolls, apparently as secondary invaders following injury by bollworms. Larvae of a PYRALID MOTH (*Noctuelia rufofascialis*) lightly damaged cotton squares in the south central area of TEXAS in 1963.

CABBAGE LOOPER (*Trichoplusia ni*) was present early in the season in CALIFORNIA, but it was not a problem until midseason. Fairly heavy populations persisted in cotton throughout the harvest season. Large numbers of larvae occurred in nearly all areas of ARIZONA, and controls were necessary in most areas. Parasites and disease aided in control efforts, but these were unable to prevent heavy damage in many areas. In NEVADA, populations began increasing in Nye County fields in late September and heavy infestations, which developed during October, aided in defoliating fields prior to picking. Localized infestations caused concern in several areas of TEXAS, but infestations were not generally distributed. Cabbage looper was observed on cotton in OKLAHOMA and MISSOURI. It was a problem from time to time throughout the growing season in GEORGIA. Infestations seem to be coming a bit earlier each year in that State. Cabbage looper was more of a general problem in NORTH CAROLINA than usual. However, it was still not a serious problem in most fields. Reports of heavily infested fields in Nash and Cumberland Counties were received during the first week of August and serious defoliation was observed in an area of Robeson County during the third week of August.

BEET ARMYWORM (*Spodoptera exigua*) infestations were light to heavy in GEORGIA, with most being light to moderate. This insect has been found on cotton from southwest to north Georgia. It has not been reported on cotton from northeast, southeast or south central Georgia. Infestations in northwest and north Georgia were very light. Beet armyworm was of some concern to cotton growers in a few of the central ALABAMA counties in 1963. This pest has not caused the damage that was feared it would when it was first recorded on that crop in 1962 in one county. A few specimens were found on cotton during the season in MISSISSIPPI, mostly in August and September. Beet armyworm caused some concern in the west TEXAS area, but it was greatly reduced compared with the 1962 infestation. Spotted populations were found in central ARIZONA and some damage was noted, particularly in Maricopa and Pinal Counties. A few controls were applied, but in most instances, controls for other insects also reduced economic levels of this species. Some late season occurrence of beet armyworm was noted in the San Joaquin Valley of CALIFORNIA.

Large numbers of GRANULATE CUTWORM (Feltia subterranea) eggs were found on cotton during June and July in the north delta area of MISSISSIPPI. These eggs were misidentified as Heliothis spp. by cotton scouts and in many cases chemical controls were initiated. The larvae of Feltia spp. were not found damaging cotton during the season. Scattered infestations of several CUTWORMS required controls in the south TEXAS area early in the season, and cutworms were of minor importance in ALABAMA.

SALT-MARSH CATERPILLAR (Estigmene acrea) increases to above normal populations in September and October in ARIZONA caused considerable damage to cotton. Some fields in Pinal County were harvested early because of the extreme amount of damage. The pest was also fairly heavy on cotton in Imperial County, CALIFORNIA. Salt-marsh caterpillar was a minor pest which occurred in localized areas of TEXAS, but it did not cause general damage over the State.

A LEAF ROLLER (Platynota stultana) occurred in light to medium, local infestations in the desert cotton plantings of CALIFORNIA, and in the San Joaquin Valley in areas adjacent to rose-growing plots.

Light infestations of COTTON LEAF PERFORATOR (Bucculatrix thurberiella) appeared in Maricopa and Pinal Counties, ARIZONA, in mid-July. Rapid increases in August and September required some control measures. Fairly heavy populations also developed in the desert areas of Imperial and Riverside Counties, CALIFORNIA. Only an occasional larva was noted in Dona Ana County, NEW MEXICO, cotton fields in October.

CELERY LEAF TIER (Udea rubigalis) and U. profundalis were local problems in CALIFORNIA cotton fields.

GARDEN WEBWORM (Loxostege similalis) infestations caused concern in central and west central TEXAS as well as west Texas. Populations in OKLAHOMA increased to damaging numbers in the southwest and west central areas in late June and early July. Considerable defoliation of young cotton occurred. The pest was about normal for the year in ARKANSAS, and a few spot treatments were made. It was also observed feeding on cotton in MISSOURI.

COTTON LEAFWORM (Alabama argillacea) infestations were found in cotton fields near Solomon in Graham County, ARIZONA, on September 16. Although populations were heavy, it appeared too late to cause much economic damage. However, NEW MEXICO populations built up rapidly in most of the cotton-growing areas of the State during August, September and October. Many fields which did not receive treatments in Lea County, New Mexico, were completely defoliated. This was the first general infestation in New Mexico since 1957. Cotton leafworm caused considerable defoliation of cotton in TEXAS in the coastal bend area, and locally heavy infestations were reported in far western areas. In OKLAHOMA, the heaviest infestations in three years caused extensive defoliation in north central, central and south central areas. Lighter defoliation was inflicted in other areas of Oklahoma. In most cases defoliation helped the picking process and did not reduce the yield. Infestations were present from mid-August to late September. Cotton leafworm was more abundant in ARKANSAS than it had been for many years. The first specimen was taken August 9. Light, scattered infestations occurred in MISSOURI during the latter part of the season, but no economic damage occurred. Infestations were reported from extreme south GEORGIA in October. Usually, when cotton leafworm infestations occur in Georgia, they occur late in the season and are actually beneficial.

COWPEA APHID (Aphis craccivora) was extremely abundant on cotton seedlings in the San Joaquin Valley of CALIFORNIA. Beneficial insects helped in reducing populations. Considerable stunting resulted where populations persisted. COTTON APHID (Aphis gossypii) populations were below normal throughout ARIZONA and light, spotted infestations occurred in Clark and Nye Counties, NEVADA, in the fall. Cotton aphid was generally light in TEXAS and OKLAHOMA, but a few scattered

fields in most areas of Texas required some control measures. Similar conditions occurred in ARKANSAS and MISSOURI. Infestations of cotton aphid in GEORGIA were light to heavy, with most infestations being moderate to heavy. Cotton aphid was a minor problem in ALABAMA. Undetermined species of black APHIDS and ANTS seem to be increasing in the Coastal Plain area of SOUTH CAROLINA more so than at any time since certain chlorinated hydrocarbons were used in the mid- to late 1940's. A much more serious problem could be developing. CORN ROOT APHID (Anuraphis maidiradicis) and another APHID (Smynthurodes betae) were present on the roots of cotton in a number of fields in Northampton County, NORTH CAROLINA, on July 18. S. betae was not known to be a pest of cotton previously in the State.

A plant bug complex, including COTTON LEAFHOPPER (Psallus seriatus), TARNISHED PLANT BUG (Lygus lineolaris), RAPID PLANT BUG (Adelphocoris rapidus) and Neurocolpus nubilus, was found infesting as much as 80 percent of the scouted fields in MISSOURI at one time during the season. Five percent of the scouted acreage had infestations higher than the level where control is recommended in Missouri; however, only 0.8 percent of the scouted acres were reported treated. Tarnished plant bug, cotton fleahopper, rapid plant bug and N. nubilus were present during the year in ARKANSAS, but all were of minor importance. Tarnished plant bug and cotton fleahopper are the principal plant bugs in Arkansas, and N. nubilus is more numerous in the northeast area of the State than it is in other areas. Less than one percent of Arkansas cotton fields were treated for plant bugs. Cotton fleahopper was also present on cotton in OKLAHOMA. Populations of cotton fleahopper were heavier than in 1962 in most areas of TEXAS, with extremely dry conditions causing early migration to cotton fields. Cotton fleahopper began appearing in NEW MEXICO cotton fields in relatively large numbers about the third week of June in the southern counties, and many growers treated. Light local infestations of a FALSE CHINCH BUG (Nysius sp.) were reported on cotton in Kern County, CALIFORNIA.

A BLACK COTTON FLEAHOPPER (Spanogonicus albofasciatus) appeared on cotton in light to medium numbers early in the season in ARIZONA. Heavier infestations continued to plague growers in central Arizona during June and early July. It began appearing in NEW MEXICO cotton fields in relatively large numbers about the third week of June in southern counties. Many growers treated. S. albofasciatus was collected on cotton in Jefferson County, ARKANSAS, on September 28; a new State record.

LYGUS BUGS (Lygus spp.) were very prevalent in CALIFORNIA cotton from early in the season. Many severe infestations developed in all cotton-growing areas. Lygus bugs were among the most damaging pests of cotton in ARIZONA, particularly during the early and midstages of the cotton season. The peak populations corresponded with the cutting of alfalfa. Damage occurred in Arizona until the first of October. Lygus bugs began to increase in Nye County, NEVADA, in late July and early August, but treatments were generally not begun until late August with populations at lowest levels in several years. In Clark County, lygus bugs were not a problem. In NEW MEXICO, lygus bugs began appearing in cotton fields in relatively large numbers about the third week of June in southern counties. Many growers treated their fields for these pests. Lygus bugs were minor pests in ALABAMA and TEXAS.

STINK BUGS were present in all cotton-growing areas of CALIFORNIA. Infestations were spotty and heaviest in Imperial County. PERIODICAL CICADAS oviposited in stems of cotton in isolated cases in ARKANSAS.

LEAFHOPPERS varied from light to heavy in various locations over the cotton-growing areas of CALIFORNIA. The heaviest populations were in the desert areas of Riverside and Imperial Counties. Empoasca sp. populations were above those of 1962 in Clark County, NEVADA, but below the 1961 levels. Only two fields were heavily damaged in August. In MISSOURI, Oncometopia undata and other species of leafhoppers were noted feeding on cotton. WHITEFLIES were abundant in some fields of cotton in Kern County, CALIFORNIA.

Damage by THRIPS was more noticeable in the lower Coastal Plain area of SOUTH CAROLINA than in past years, and infestations in GEORGIA were light to heavy with most moderate to heavy. Thrips were regarded as minor pests in ALABAMA, ARKANSAS and OKLAHOMA, but infestations of several species were generally light over TEXAS with scattered fields in most areas requiring some controls. In the Tallulah area of LOUISIANA, thrips damage was rather severe in untreated fields. Controls became rather general in the area. Thrips, mainly TOBACCO THRIPS (Frankliniella fusca), were extremely heavy in late-planted cotton fields in MISSOURI where emergence was delayed. Treatments were applied for thrips control to approximately seven percent of the scouted acreage. The majority of treatments in Missouri were on late-planted cotton. Frankliniella sp. caused heavy damage to seedling cotton in several Clark County, NEVADA, fields in May. In CALIFORNIA, thrips in general were quite heavy on cotton in Imperial County and on early cotton in other areas. Leucothrips piercei was medium to heavy in Imperial and Riverside Counties, and CITRUS THRIPS (Scirtothrips citri) was light in Imperial County.

SEED-CORN MAGGOT (Hylemya platura) populations were heavy on seedling cotton in Firebaugh, Fresno County, CALIFORNIA, and it was observed on cotton in MISSOURI. Unspecified MAGGOTS were reported damaging cotton seed rather heavily in Swisher County, TEXAS.

SPIDER MITES (Tetranychus spp.) began increasing in NORTH CAROLINA cotton fields earlier than in 1962. Reports of infestations from both the Piedmont and Coastal Plain areas began in early July. Infestations were greater than the preceding year in all cotton-growing areas of North Carolina. Damage in the Piedmont was the highest observed since 1955 and was due to early and uniform infestations. Many of the smaller fields on the Coastal Plain were observed to be heavily infested during August. Spider mites were the major threat to cotton in the Piedmont of SOUTH CAROLINA. They appeared to be more important than in past years. Dry conditions in July and August tended to increase damage. Infestations in GEORGIA were light to heavy, with most being light to moderate. Infestations in ALABAMA were somewhat serious in the northern areas, especially on Sand Mountain and in the Tennessee Valley. Isolated growers experienced some resistance to recommended miticides. Spider mites were also a problem locally in the cotton-growing area of TENNESSEE.

Various species of MITES occurred in a larger percent of ARKANSAS fields in 1963 than in 1962 during all weeks except the third and fourth week of June. The percentage of fields with mites present in 1963 exceeded the 5-year average in all weeks except the third week of June. Fields treated for mites in Arkansas exceeded one percent in only one week. Infestations of spider mites in MISSOURI, largely STRAWBERRY SPIDER MITE (Tetranychus atlanticus), gradually increased during July, but became severe in isolated fields only. Spot and strip treatments were effective in preventing spread of many early infestations. T. cinnabarinus was extremely difficult to control in the Brazos River bottoms area of central TEXAS. This mite is spreading more each year in that State and is increasingly more difficult to control. Other Tetranychus spp. were present in varying populations over Texas, with some scattered fields requiring control.

Spider mites were only of minor importance in most cotton-growing areas of NEW MEXICO. Spotted, light to heavy infestations were reported in Chaves and northern Eddy Counties. In NEVADA, populations of Tetranychus sp. were very light on seedling cotton, but it became heavy during late September and October in Clark County. Infestations were heavy on seedling cotton from late May through June and were medium to heavy in September and October in Nye County.

Infestations of MITES in CALIFORNIA began in June on cotton in the Imperial Valley, Imperial County, and infestations began showing and progressing in other cotton-growing areas. TWO-SPOTTED SPIDER MITE (T. telarius) and T. cinnabarinus were serious during June on cotton. Treatment reduced the populations and, in some cases, cotton outgrew the mites; however, control was a continuing problem

in California. Large cotton and poor coverage with recommended materials were the primary reasons for poor control Strawberry spider mite (T. atlanticus) was light to medium in areas of the San Joaquin Valley of California. Some defoliation resulted.

Insect pests of cotton in FLORIDA did not cause any special problem, and they were kept under control by the appropriate insecticides. Cotton acreage is decreasing in Florida.

Snowfall was widespread and locally heavy, with accumulations of 6 to 12 inches in parts of east-central Oklahoma and 2 to 9 inches in northwestern Arkansas. St. Louis, Missouri, reported 6 inches of snow on Monday evening, the 9th. In the Northeast, snowfall ranged from 2 to 5 inches in northern and western Maryland, up to 19 inches at Newport, Vermont, and 17 inches at Boonville, New York. Falls generally ranged from 12 to 15 inches in New York's Mohawk Valley and southern Adirondack region, and 5 to 15 inches in northern New England. A combination of wind and glaze damaged utility lines in southern New England. Damaging winds occurred in middle Atlantic coastal areas on the 10th.

The stormy weather east of the Rockies was followed by a brief cool spell, with freezing as far south as central Texas after which warm, sunny weather was the rule until another frontal system brought widespread, mostly light to moderate showers during the weekend. Occasional strong winds in the Great Plains whipped up dust in western Kansas and eastern Colorado.

In the Pacific Northwest, almost daily precipitation improved the mountain snowpack with several stations in the Cascades reporting the greatest depths of the season to date. In Washington, depths are 180 inches at 3,000 feet and 230 inches above 5,000 feet.

The week was considerably colder than normal west of the Contiental Divide, about normal in the lower Great Plains, and warmer than normal elsewhere. Weekly averages ranged up to 8° below normal in the Far West, and 10° to 13° above in the northern Great Plains. In the East, averages were below normal in Maine, and above normal elsewhere with departures ranging from 2° or 3° in the North to as much as 7° in southern Florida. In Arizona on the 9th, freezing occurred as far south as the Yuma area, and Phoenix reported a late season low of 29°.

Weekly precipitation totals were well above normal from the lower Mississippi Valley northeastward. Two to 5-inch totals were common in this area. Soil moisture was replenished in much of the eastern portion of the Corn Belt. Precipitation was very light and scattered in the Great Plains and virtually nil in the Far Southwest. In northern areas west of the Continental Divide, weekly totals ranged from 1 to 3 inches along the coast and generally about 0.20 to 0.50 inch inland. (Summary supplied by U.S. Weather Bureau).

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